

REMARKS

Claims 1-50 are pending. Claims 1, 18, 20, 34, 35 and 38 are amended. Claims 14-16 and 19-20 are cancelled. Claims 41-50 are added. Claims 28-33 and 40 are allowed. A Terminal Disclaimer is filed herewith with respect to co-pending US Patent Application Serial No. 10/030996. No new matter is submitted by the amendment. Accordingly, entry of the Amendment and Terminal Disclaimer is respectfully requested.

Applicants' appreciate the indication of allowability in item 15 of the Office Action pertaining to claims 28-33 and 40. Applicants' further appreciate the indication in item 17 of the Office of claim 26 as allowable if rewritten into independent form including all of the limitations of the base claim and any intervening claims. New claim 41 is submitted herein and corresponds to the subject matter originally set forth in claim 26. Accordingly, it is respectfully submitted that claim 41 should be allowed.

New claims 42-50 are submitted and correspond to claims 2-7, 10-11 and 13 as presented for consideration in the last Office Action. The only rejection set forth for this later set of claims is for provisional double patenting. This rejection is cured by submission of the filed terminal disclosures. Accordingly, claims 42-50 should also now be allowable. Additionally, claims 37 and 39 have been rejected only under this double patenting rejection and should now be allowed.

In item 1 of the Office Action, claim 16 is objected to as allegedly duplicating the temperature recited in claim 1, line 11. Claim 16 has been cancelled. Accordingly, withdrawal of the objection to claim 16 is respectfully requested.

In item 2 of the Office Action, claims 1-8, 10-17, 27 and 35-39 are rejected based on the judicially created doctrine of non-statutory obviousness-type double patenting over co-pending US Patent Application Serial No. 10/030996, of common assignment herewith. Although Applicants' strenuously contend that this rejection is improper, Applicants' submit herewith a Terminal Disclaimer with respect to co-pending US Patent Application Serial No. 10/030996 in the interest of expediting prosecution of the instant application. The Terminal

Disclaimer having obviated the alleged non-statutory obviousness-type double patenting rejection, withdrawal of the same is respectfully requested.

Applicants' invention is directed toward low temperature sputter target/backing plate bonding methods and assemblies made thereby. Independent claims 1, 18, 34, 35 and 38 and dependent claims 8-9, 12, 14-17, 19-25, and 27 stand rejected on various art based grounds in light of either Fan, Hunt, Demaray, taken in some instances singly or in other rejections in varying combinations and sub-combinations.

Independent claims 1, 18, 34, 35 and 38 have been amended to specify that the assembly is pressure consolidated at a temperature of less than about 38°C to bondingly join the target and backing plate together. Support for these amendments may be seen, inter alia, at page 6, l. 1-16. Note also that these independent claims require that the salient portions or projections penetrate into the other of the surfaces and form a mechanical lock thereover.

Fan discloses a target 100 and backing plate 200, each provided with a plurality of teeth 140, 240, wherein one of the target and backing plate is concave (col. 6, lines 6-10 & 19-23) in order to offset the bowing that often occurs by the cooling water applied to the backing plate (col. 5, lines 49-52). The plurality of teeth 140, 240 of Fan are hand pressed together and twisted (col. 4, lines 48-54) in order to fit the target and backing plate together. As thermal expansion occurs during sputtering, the teeth expand causing greater engagement between the teeth and more effective heat transfer (col. 5, lines 12-16). The teeth 140 and 240 in Fan never penetrate into the opposing interfacial surface and never form a mechanical lock as recited in claims 1, 18, 34, 35 and 38 of Applicants' invention. Nor is there any suggestion to do so in Fan as the teeth are used to merely expand and abut one another during increased thermal conditions during sputtering in order to effect greater heat transfer rather than to penetrate the surface of either of the target or backing plate to achieve a mechanical lock. The target and backing plate in Fan are not bondingly joined as a simple twisting of the target relative to the backing plate is used to separate the two assembly components.

Accordingly, Fan is deficient in making any hint or suggestion of the features of the independent claims as indicated below with respect to at least claims 1, 18, 34, 35 and 38:

Deficiencies of Fan

Independent claims 1, 18, 34, 35 and 38

- (1) Fan makes no suggestion of the low temperature pressure consolidation at temperatures less than 38°C to bondingly join target and backing plate; and
- (2) Fan makes no suggestion of projections or salient portions that penetrate into and mechanically lock over the other of the mating surfaces.

Hunt, et al., discloses a target 10 and backing plate 16 joined by roughening the surface of at least one of the target and backing plate (col. 5, lines 47-56), or drilling holes 28 in one of the target and backing plate (col. 6, lines 13-15) and then pressing the target and backing plate together under hot isostatic pressing or uniaxial hot pressing conditions (col. 6, lines 39-43). The minimum temperature disclosed in Table 1 of Hunt, et al. is 300°C. Thus, Hunt teaches away from the temperature conditions claimed in independent claims 1, 18, 34, 35 and 38.

Demaray discloses a target 48 solder bonded to a backing plate 50. A finned cover 52 is then also bonded to another surface of the backing plate 50 to provide cooling water behind the backing plate. Thus, Demaray fails to disclose the mechanical lock between the target and backing plate as recited independent claims 1, 18, 34, 35 and 38. Further, this reference does not teach the temperature range set forth in the above independent claims that are used to form a mechanical interlock. Also, the reference doesn't teach projections or salient portions that penetrate into the other surface.

Qamar is applied for teaching the peripheral bonding or welding aspects recited in claims 24 and 25, respectively. Qamar, however, fails to teach bonding of the target and backing plate with a low temperature of less than 38°C, or the mechanical locking of the mating surfaces by the penetrating projections or salient portions as recited in the instant claim.

Dunlop discloses a method of producing sputter targets by forge cladding, wherein one of the target and backing plate is provided with grooves. The assembly is pressed together at temperatures just below the melting point of the non-grooved one of the target and backing plate. Dunlop, fails to disclose the specific temperature range required in claims 1, 18, 34, 35 and 38.

Reconsideration of the application, in view of the amendments and remarks made herein, is respectfully requested. Applicants earnestly contend that all claims presented are in full conformity with the patent statute and accordingly, allowance of all claims is respectfully solicited.

Should the Examiner determine that anything else is desirable to place this application in even better form for allowance, the Examiner is respectfully requested to contact the undersigned at the telephone number below.

Respectfully submitted,
WEGMAN, HESSLER & VANDERBURG

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By: Bruce E. Peacock
Bruce E. Peacock
Reg. No. 28,457

Suite 200
6055 Rockside Woods Boulevard
Cleveland, Ohio 44131
216/642-3342